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ABSTRACT

Three studies give evidence to support informal reports of sex differences in computer access, interest, and use in the school-aged population. In the first study, a survey of 87 middle and upper income students in grades 5 to 8 revealed that more boys than girls owned home microcomputers and that use of the home computer also differed by gender. In the second study, questionnaires were sent to directors of summer camps and classes that offered training in programming for microcomputers. Data supplied by 23 camp directors on 5,533 students indicated that enrollment in such camps and classes showed a pattern of three to one in favor of boys. The ratio of boys to girls increased with level of course difficulty and cost of session. In a third study, 157 middle school students from 3 school districts located in lower, middle, and upper income areas were asked to rate a list of 75 software titles for perceived user interest. Results indicated that a significantly greater number of the titles, which were randomly selected from a list developed for three major microcomputer manufacturers, were perceived as primarily suited for male audiences. A bibliography and supporting data are attached. (Author/LMM)

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SEX DIFFERENCES IN COMPUTER ACCESS, INTEREST AND USAGE

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Paper presented at the 91st Annual Convention of the American Psychological Association at Anaheim, CA, August 1983

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Abstract

Three studies give evidence to support informal reports of sex differences in computer access, interest and usage in the school-aged population. Study 1: a survey of middle school students revealed that more boys than girls own home microcomputers; use of the home computer also differed by gender. Study 2: enrollment in computer camps and summer classes showed a pattern of three to one in favor of boys. The ratio of boys to girls increased with level of course difficulty and cost of session. Study 3: student ratings of titles from a random sampling of computer software indicated that a significantly greater number are perceived as primarily suited for a male audience.

Sex Differences in Computer Access, Interest and Usage

The computer offers unlimited access to information, and information is power. It is projected that by 1995 there will be at least 48 million computers in the United States, and the number of people using them is also expected to increase. One-half of the users should be women. However, as more and more schools introduce computer literacy (computer awareness and programming skills) into the curriculum, some educators voice concern that girls exhibit less interest than boys in learning to use and program the computer. The three studies described were conducted in an effort to gather evidence confirming these informal reports of individual differences in computer access, interest and usage. The first is a survey of home ownership in the middle school age range; the second, an assessment of enrollment patterns in summer computer camps and classes; the last, a rating of perceived sex typing in software titles.

Mathematics and technology generally have been regarded as male domains. However, recent attempts to combat traditional inequities in access to education and employment have kindled a new awareness of gender differences in these areas. In particular, attention is now being focused on the field of computer technology. According to The Chronicle of Higher Education statistics for 1980, 11,114 bachelor's degrees were conferred in computer science in the United States in that year. Of these, only 30% were awarded to women.

The topic has additional significance today because it is predicted

that nine out of ten women will be employed outside the home for some period of their lives (Report of the education committee of the Commission on the Status of Women). Competence in mathematics and technology is an important prerequisite for a wide variety of occupations, not only those in computer science. As in careers in mathematics and the natural sciences, careers in business and the social sciences are now requiring a strong background in math and computing because of the increasing reliance on statistics and computer technology in those fields.

Study 1: The middle school computer owner: Parental influences and educational expectations. Home ownership offers increased access to the computer and may also indicate parental effort to promote computer literacy. In a survey of 87 middle and upper income students in grades five through eight, the 13% who reported owning home microcomputers were all boys. This was unexpected in a population evenly divided between boys and girls who had had equal exposure to computer activities at school. Interviews with the students showed that the typical owner in this study was a high academic achiever who enjoyed programming and playing games on his computer. Table 1 lists these characteristics. Because a number of students indicated that their families were considering the purchase of a microcomputer, a follow-up survey of the same population was conducted six months later. Two more students reported home ownership; a boy from a family with three boys and a girl who had one sister in the primary grades.

One year after the first study, the 6th, 7th and 8th graders who had been part of the original sample were again polled. Thirteen boys and six girls reported having a home microcomputer, an increase in home ownership

in this group to 35% with a two to one ratio of boys to girls.

An interview with a typical (based on this study) computer-owner family showed that the amount of time spent using the computer differed by sex. The two sons in the family were the heaviest users, spending an average of two to three hours per day playing and programming games. The father used the computer routinely for business purposes. The mother reported that she did not use the computer at all.

Study 2: Survey of enrollment patterns by sex in summer computer camps and classes. Informal reports suggest that computer literacy is sought more often by boys than by girls. In order to gather systematic data on this point, questionnaires were sent to directors of summer camps and classes that offered training in programming for microcomputers. Enrollment showed a pattern of three to one in favor of boys for all grade levels. A total of 23 camp directors from all sections of the United States responded by mail and telephone with data on 5,533 students. These camps were run by a variety of sponsors; public schools (some financed through PTA funds), universities and colleges, and by private and corporate enterprises. Summer camps also differed by cost and accommodations with those sponsored by public schools being the most reasonable (as low as $25 for a two-week day session) and the most expensive being the private residential camps which ranged upwards to $1,500+ for a four-week stay. Demographic breakdowns for the sample are given in Table 2.

When enrollment was analyzed by course level, the proportion of girls in beginning and intermediate classes was 28%; the proportion dropped to 14% in advanced programming classes, and to 5% in higher level courses

teaching assembly language. See Figure 1. An interesting finding was a significant inverse trend shown in Figure 2; as cost for the sessions increased, the number of girls enrolled decreased. This may reflect the general inclination of parents to encourage computer literacy more aggressively for their sons, perhaps looking ahead to their futures in a technical career. Several camp directors suggested that parents, particularly fathers, were actively interested in promoting computer awareness for their sons, but not for their daughters.

Study 3: Perceptions of sex typing in titles of computer software. The results of our third study on perceptions of sex typing in titles of computer software indicated that fewer computer activities are perceived as being developed primarily for females than for males. Although the microcomputer has a wide variety of applications, for the school-aged child, games are its primary attraction. A recent Time magazine report (May 23, 1983, p. 61) shows that more than 50% of personal computer owners use their machines to play games, and games are projected to total 52% of all software sold for home use. Boys and girls differ in the types of computer games they prefer. In an earlier study, Miura found that girls generally selected games that involve writing or music, while boys were more attracted to competitive "action" games requiring eye-hand coordination. The lack of suitable software has been offered as one reason for sex differences in computer interest and usage.

One-hundred fifty-seven middle school students from three school districts (located in lower, middle and upper income areas) were asked to rate a list of 75 software titles for perceived user-interest on a scale of 1 to 5 (1=male; 5=female). The titles were randomly selected from the listings of software developed for three major microcomputer manufacturers.

Fifty-three percent were from the entertainment section, 32% from education, and 15% were of general interest. See Figure 3.

In this sample of software titles, more were perceived as being of interest to males than females. Twenty-six (35%) of the titles received a mean rating less than 2.5, i.e., of primary interest to males, compared to four (5%) that were rated greater than 3.5, i.e., of primary interest to females. In addition, 39% of the total number of ratings made by the subjects were either 1 or 2; only 17% were 4 or 5. Boys and girls did not differ in their ratings except that girls were less likely than boys to rate software as primarily suited for females.

The survey was replicated with 30 adult subjects enrolled in two west coast universities. The results supported the original findings: 39% of the ratings were 1 or 2; 13% were 4 or 5. Twenty-nine (39%) of the titles received a mean rating less than 2.5, compared to 4 (5%) that received a mean rating greater than 3.5.

Conclusions

Because these differences are noted in the school-aged population, the problem is an important one for researchers in child development and educational psychology. The evidence of sex differences in computer literacy has both theoretical and social importance. The social significance follows from the impact that inequities in economic and educational opportunities will have on the career lives of individuals who do not have the requisite technological skills. The theoretical importance suggests the need to analyze the psychological processes that contribute to these differences in computer literacy in an effort to develop effective intervention strategies to minimize the growing gender gap in computer access, interest and usage.

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Table 1

Typical Home Microcomputer Owner
in the 10-14 Years Age Range

- Is a high academic achiever
- Enjoys programming and playing games on the computer
- Has two or fewer siblings at home
- Is a male

Table 2

Enrollment in Computer Summer Camps
by Sex, Grade Level, and Sponsorship
(Numbers and Percentages)

Sponsorship	Primary			Middle School			High School			TOTALS		
	N	%F	%M	N	%F	%M	N.	%F	%M	N	%F	%M
Private (N=10)	440	21	79	1522	22	78	1018	23	77	2980	22	78
Public School (N=5)	245	44	56	567	30	70	—	—	—	8'2	35	65
University (N=8)	318	31	69	1128	29	71	295	27	73	1741	29	71
TOTAL	1003	30	70	3217	26	74	1313	24	76	5533	26	74

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Figure 1

Enrollment By Difficulty of Computer Curriculum

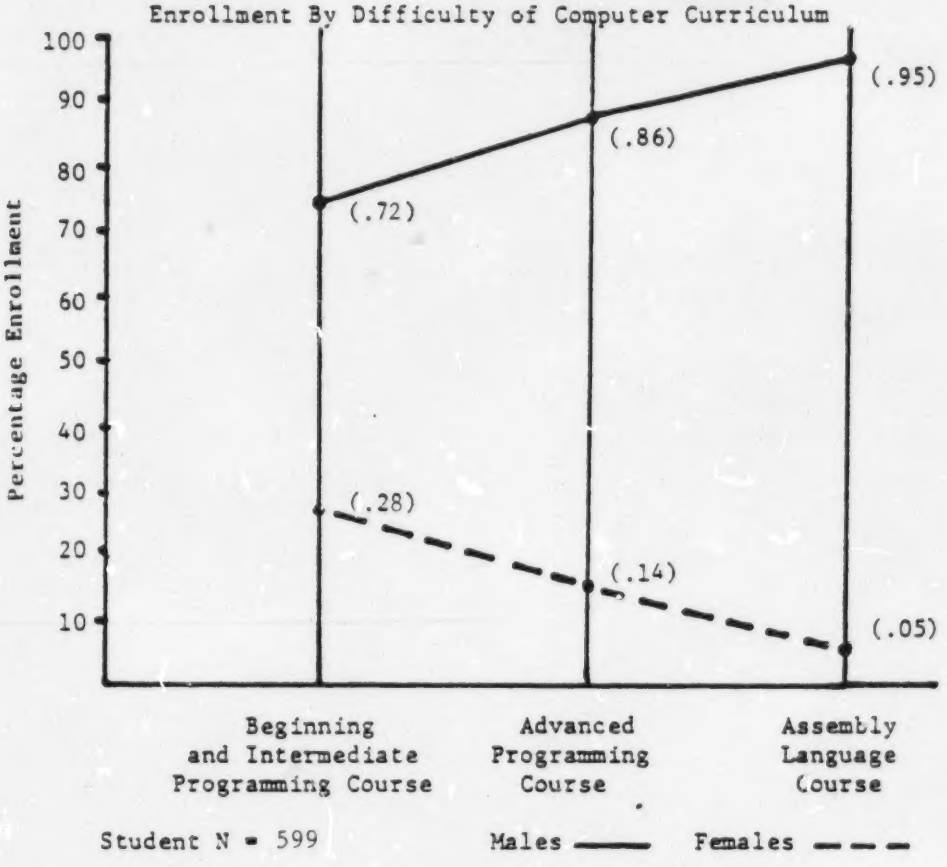

Figure 2

Enrollment By Cost of Sessions

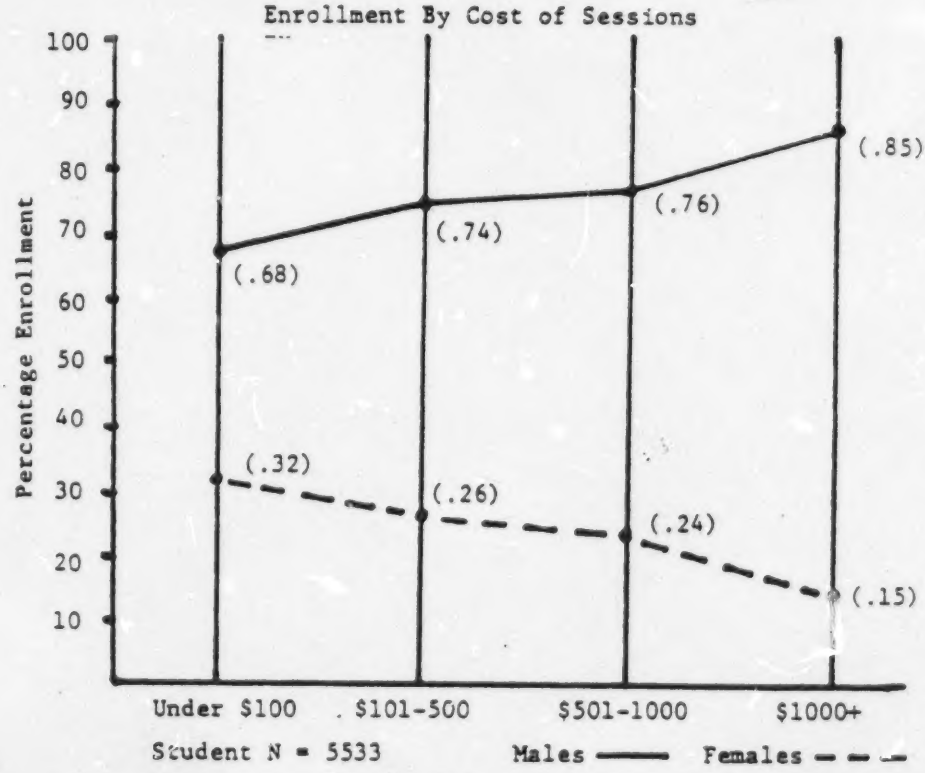

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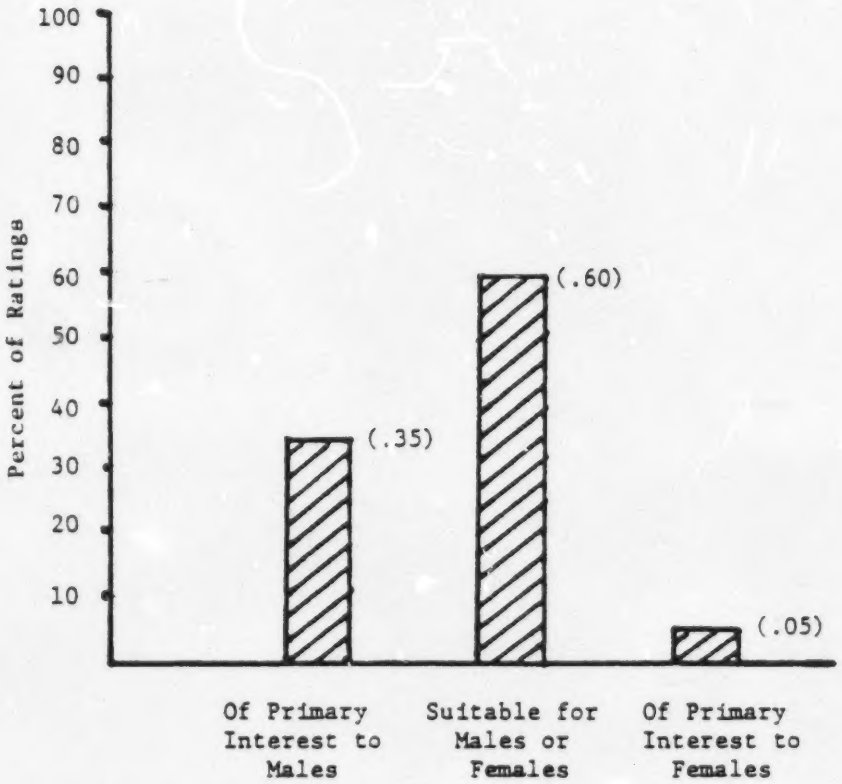
Figure 3

Perceptions of Sex Typing in Titles of Computer Software



Based on ratings of 75 software titles (53% entertainment; 32% education; 15% general interest) selected at random from the listings of software developed for three major microcomputer manufacturers.

Student N = 157; 80 Males, 77 Females

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